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Five year means of meteorological observations made at the ocean weather stations Item and India, Jig and Juliett. 1948-52

by

R.F.M. Hay
(Meteorological Office)

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1. Introduction

Before regular meteorological observations had been started at ocean weather stations in the N. Atlantic towards the end of 1947, it had not been possible to describe the climate of a fixed point in the open ocean in the same detail and to the same order of accuracy as in the case of a land station. The summary of weather and currents at the original ocean weather station positions I and J by Gordon and Barlow(1) which related to the period August, 1947 to March, 1950 was the first published summary which gave results derived from a continuous series of observations at a fixed point away from land. Since that time the manning of the ocean weather stations has been continued, and this paper contains monthly mean values of the principal meteorological elements based on the five years 1948 to 1952. This period is of course too short to yield means which are quite representative.

2. Ocean weather stations

By international agreement the positions of both ocean weather stations were shifted by approximately 70 nautical miles on 25th March, 1950*. The assumption has been made therefore that the mean values given in Tables 1-13 are the same as those which would have been obtained from positions nearly mid-way between the positions occupied by the ships before and after 25th March, 1950, assuming these mid-way positions had been manned through the same five years. Such an assumption naturally involves errors, but it is considered these will be relatively small in this region where horizontal gradients of temperature are not pronounced. In the next place, on several occasions, the weather ship manning station I has been moved away for special purposes to a position some 150 nautical miles to ENE. (61°N.$14\frac{1}{2}^{\circ}$W.). Data for the few days when this move happened during 1948-52 were excluded in computing the tables. During 1953 removals of the ship on duty at station I to this position were more frequent than in the previous years, so that it was decided that better results would be obtained by omitting this year

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* For convenience throughout this paper the ocean weather stations will be referred to as I and J. Their positions and official descriptions during the period 1948-52 were in fact as follows:-

ITEM 60°00'N.20°00'W. to 0800Z, 25th March, 1950;
INDIA 59°00'N.19°00'W. after 0800Z, 25th March, 1950;

JIG 53°50'N.18°40'W. to 0230Z, 25th March, 1950;
JULIETT 52°30'N.20°00'W. after 0230Z, 25th March, 1950.

from the calculations. Lastly observations are made aboard the ocean weather ships at the eight synoptic hours (00, 03, 06, 09, 12, 15, 18 and 21 G.M.T.), and the tables are based upon these observations except where there is a statement to the contrary.

3. The monthly mean values

Tables 1-11 contain monthly mean values of the principal meteorological elements observed aboard the ocean weather ships. Information about observational procedures is given either in the sub-paragraphs below, or in paragraph 5.

(a) Wind

Mean surface wind speed for the year is slightly higher at J (18.3 kt.) than at I (17.7 kt.). At both stations January is the windiest month, but the quietest months are July at J and August at station I. The mean wind speeds shown in Table 1 have been corrected to the standard height of 33 ft.; in the British ocean weather ships the actual height of the anemometer cups is approximately 55 ft. For the relation of mean wind velocity v to height h, most writers assume a relation of the form:-

$$v = kh^{\alpha}$$

The value of α depends largely upon the kind of surface over which observations are made and is larger over a smooth than a rough surface. Carruthers(2) quotes some figures due to C.E.P. Brooks which give values of α of 0.13 over the open sea and 0.15 over low islands. The nature of the air flow over an ocean weather ship (or any ship) hardly seems comparable to the exposure which would be found over the open sea away from obstructions. Hence the exposure of the anemometers has been assumed to correspond to the conditions on a low island and a value of 0.15 has been assigned to α, in the expression $V_h/V_{10} = (h/10)^{.15}$ where h is in metres. Taking the height of ships' anemometers as 16.8 m. (55 ft.) and the standard height as 10m. (33 ft.) this gives $V_{16.8} = V_{10} \times 1.08$ whence the factor to convert winds at 55 ft. to 33 ft. is found to be 0.93. The figures in Table 1 were obtained by multiplying the mean winds for the ocean weather ships at the anemometer level by this factor.

The windiness of these ocean weather stations is clearly shown by referring to Table 2. Over the year, mean wind speed at station I is nearly 25% greater than the value at Lerwick, the nearest land station lying in the same latitude. Similarly the value for station J is three quarters as large again as the mean wind speed recorded at Valentia. Both ocean weather stations I and J have rather higher wind speeds than Macquarie, Heard and Deception Islands which lie near the most frequented storm tracks of the southern ocean, although they are still far less windy than the coast of Antarctica at Adélie Land as found by the Mawson expedition in 1912-13.

The percentage frequencies of certain ranges of wind force related to direction are given in Tables 3 and 4, which show that winds of force 8-12 were more frequent at station I than at station J in all months except May, June, July, August, October and December. Table 9 shows that the number of gale days was 92 at station I and 117 at station J; the smaller number of gale days at I being due to a marked falling off in the frequency of gale days in the summer months at I as compared with J. A gale day was defined as a day (0-24 G.M.T.) when wind force 8 and above occurred, at one or more of the eight synoptic hours of observation.

Table 5 gives the number of occasions on which winds of force 8-12 occurred from different directions. Storm force winds of force 10 have occurred from all directions at both stations, and force 11 has occurred with winds between east and south as well as from all directions with a westerly component. The second part of the table shows that force 10 has occurred in all months at I except in June, July and August, and at J except in May, June and July.

(b) Pressure

The mean monthly values of pressure, together with the absolute extreme values reported through the five years in each month, are given in Table 6. In this table are also shown the differences between these values and the corresponding values taken from the Monthly Meteorological Charts of the Atlantic Ocean (M.O.483)(3) expressed as the differences (Table 5 - M.O.483) in each case. The large value of the differences in some months is hardly surprising, in view of the shortness of the period used for determining the means.

Interesting features of these tables are the fact that the normal pressure gradient between J and I was reversed in May (1948-52), and that at J pressure reached its highest mean monthly value in July, but at I in May. The highest pressure so far observed at these stations (1046.4 mb. at J in January) is not far short of the absolute extreme recorded for a land station in the British Isles (1054.7 mb. at Aberdeen on 31st January, 1902). Although the lowest values of pressure so far observed at either station have not been lower than the extreme lowest value of 925.5 mb. recorded on land in the British Isles, (at Aberdeen on 26th January, 1884) the monthly absolute extremes for February at I and for October at J during this five years were lower than the corresponding long period figures for the British Isles for these months (4). Lower extreme values of pressure have so far been reported at J than at I in the months of March, May, August, October and December. The range between the absolute extremes of pressure so far recorded at I is 96.6 mb. and at J 105.4 mb.

(c) Temperature

Monthly means of dry bulb temperature and dewpoint, also extreme temperatures, are given in Tables 7 and 8 for the two stations. Mean ranges of average monthly temperatures (11.5°F. at I, 11.2°F. at J) compare with values of 15°F. on the western seaboard of the United Kingdom and 23°F. in East Anglia(4). The ranges of extremes (33.3°F. at I and 30.5°F. at J) are far lower than at land stations in the British Isles. Air temperature has never fallen below freezing point at J, and only on 18 days in five years at I. These days were distributed as follows, December and January 5 each, February 4, March 2, April and November 1 each.

Monthly mean sea temperatures are included in the same table, also mean monthly values of air-minus-sea temperature difference, which are of greater scientific interest. The latter show a fairly regular seasonal variation, at station I they vary between -5·0°F. in January to -0·8°F. in July, and at station J from -3·9°F. in February to -0·2°F. in June. Thus on the average the air is colder than the sea at all seasons through the year. However the mean air-minus-sea temperature difference has a very small negative value during the spring and early summer. In individual years air temperatures exceed sea temperatures at both stations for periods of 2 or 3 weeks in the spring and early summer and very occasionally for a few days in the autumn and winter.

(d) Weather

Table 9 brings out clearly the notably high annual frequency of precipitation at both stations, 323 days at station I and 321 days at station J, although no precise comparison can be made between amounts of rainfall at the ocean weather stations and those at adjacent land stations until a raingauge can be devised which will make accurate measurements of precipitation amounts aboard the weather ships.

The frequency of snow and sleet at station I (54 days per annum) compares with about 35 and 40 days in the Orkneys and Shetlands respectively, similarly at station J the figure of 10 days compares with 5 days at Falmouth and 3 at Scilly. A rather similar parallelism can be found in the hail frequencies (64 days at I and 20 at Orkney, 38 at J and 16 at

Falmouth). The high frequency of hail in the winter months is probably related with the large number of occasions when the air is much colder than the sea at that season. Thunder was heard on 5 days a year at J (average 5 at Falmouth) but on 2 days a year at station I, which compares with 7 at Deerness and 3 at Stornoway.

(e) Visibility

Table 10 shows that the percentage frequency of fog (defined as all occasions when visibility was < 1000 yd.) at station I was greatest in July when it rose to 3.2%. Fog was very infrequent there from October to April; in this particular period there was no fog recorded in November. At station J the frequency of fog was higher, up to 5.4% in June and 3.6% in July; fog was infrequent from October to April and was not observed in January. At both stations there was a high frequency of visibilities above 10 miles (60-70%) which was noteworthy at J in most winter months and at I between July and January.

(f) Height of base of low cloud

Percentage frequencies are given in Table 11. Cloud below 600ft. was slightly more frequent at station J.

4. Comparison with the Monthly Meteorological Charts for the Atlantic Ocean

On the assumption that the mean positions of the stations were 59½°N. 19½°W. and 53°N. 19½°W. the monthly and annual means of pressure and air and sea temperatures given in Tables 6, 7 and 8 were compared with values obtained by interpolation from the charts given in M.O.483 (Monthly Meteorological Charts for the Atlantic Ocean). These charts were based upon readings of air and sea temperatures made by British observing ships during the period 1887-99 and by British selected ships from 1921-38. The results are shown in the last column but one on the right of Table 6 and in the two right hand columns of Tables 7 and 8. The annual values of the differences between Tables 6, 7 and 8, and M.O.483 were:-

	Pressure mb.	Air temp. °F.	Sea temp. °F.
Station I	-0.1	+0.3	+0.4
" J	+0.1	-1.1	-0.3

The results for station I agree with the conclusion that the sea and overlying air in this region have been warming up in recent years, but suggest that slight cooling has occurred at station J.

5. Diurnal variation of surface barometric pressure, wind velocity, air and sea temperature and cloud amount at ocean weather stations I and J

For the sake of completeness a few of the results of an investigation into diurnal variations of certain meteorological elements at the ocean weather stations are included here. In this investigation, which it is intended to publish in full later, surface data for the ocean weather ship stations I and J for the four years 1948-51 were used.

(a) Treatment of the data

Preliminary results obtained for the first two years 1948-49 showed that the magnitudes of the diurnal variations in both elements were in close agreement at the two stations I and J. It was therefore decided to use the data for the four years period 1948-51, ignoring the changes which were made in the positions of I and J in March, 1950, as described earlier.

As in previous work on this subject, data were used for those days only when the ships were within a square grid whose sides at their nearest were 105 miles distant from the station positions given earlier, when the

ship was considered to be "on station". In addition, only days were used on which observations were available at all eight synoptic hours from a ship "on station"; any days on which one or more observations at synoptic hours were missed were rejected. When one ship relieved another "on station", and both ships were making observations within the grid at the same time, the observations of the ship nearer to the grid centre were used.

(b) Accuracy of the observations available

(i) In obtaining results for surface barometric pressure, wind and total cloud amounts data were taken from Hollerith cards. For air and sea temperatures Hollerith cards were not considered sufficiently accurate for this part of the analysis, and therefore all temperatures used were taken from the O.W.S. log books. For the greater part of the period air and sea temperatures have been read to 0.1°F. and entered to this degree of accuracy in the log books.

(ii) Pressure was read to 0.1 mb. and punched on Hollerith cards to the same degree of accuracy.

(iii) Wind velocity was measured from the cup anemometer exposed on the mainmast about 55 ft. above the sea surface, the wind velocity being recorded in the log book and punched on Hollerith cards in Beaufort Force. The punched data have been reconverted to knots in this analysis using the appropriate mean values of Beaufort Force on the international scale.

(iv) All observations of cloud amount used in this analysis have been converted to amounts in tenths.

(v) Air temperatures were read to the nearest 0.1°F. from a thermometer in a Stevenson Screen exposed on the weather side of the ship. Data from the original log books were used.

(vi) Sea temperatures were read to the nearest 0.1°F. using a canvas bucket which aims to catch a sample from the top six inches of the sea. Data from the original log books were used. Most of the entries were made to the nearest 0.1°F. but a few were entered to the nearest 0.5°F. or 1.0°F., and had to be used in this form.

(c) Number of observations available

In the first instance the diurnal variations of the elements were determined for all days which were available after applying the procedure already described. The numbers of days for each station, element and season, which were available at the time when this investigation was begun, are shown below.

Station I

Season	Winter Dec.-Feb.	Spring Mar.-May	Summer June-Aug.	Autumn Sept.-Nov.
Pressure	257	328	319	296
Wind	268	328	318	296
Total cloud	269	327	319	296
Air temp.	269	328	318	295
Sea temp.	257	324	316	283

Station J

Season	Winter Dec.-Feb.	Spring Mar.-May	Summer June-Aug.	Autumn Sept.-Nov.
Pressure	318	359	353	348
Wind	331	360	353	349
Total cloud	331	360	353	349
Air temp.	331	360	349	349
Sea temp.	301	359	351	347

(d) Diurnal variations of sea and air temperatures (all days)

Values of the ranges of the diurnal variation of certain elements obtained from these data are given in Tables 12 and 13.

There is good agreement between the magnitudes of the yearly diurnal ranges of the two stations, and also between most of the seasonal values. There is little difference between the diurnal ranges of sea temperature in autumn and winter, and also between spring and summer.

For air temperature the ranges at both ships are largest in spring and summer and smallest in winter, the largest value for I is 1.36°F. in spring, for J 1.41°F. in summer.

For sea temperature the ranges at both ships are largest in spring and summer (0.36°F. at J in spring, 0.32°F. at I in summer), in autumn and winter the range is very small, being near 0.1°F. at both stations.

In all seasons, but particularly in summer, the range of diurnal variation of air temperature appears greatly to exceed that of sea temperature.

Radiation errors are discussed later.

(e) Diurnal variations of sea and air temperature (classified days)

The reality of these diurnal variations of air temperature is open to doubt since they are subject to errors due to heating of the air as it passes across the ship. Possibly the sea temperatures also are affected by the presence of the ship.

Sufficient data were available to make it worth while to determine separately the magnitude of diurnal variations on days when the heating effect of the ship could be expected to be (a) at a minimum and (b) at a maximum. The smallest heating from the ship would clearly occur on days with strong winds and overcast skies, while the greatest heating would similarly be anticipated on calm, sunny days.

A classification of days which are both "windy" and "cloudy" was readily devised for the ocean weather ship stations, but it proved much harder to select a definition for days which were both "quiet" and "fair" which could be used with the data, since periods as long as twenty four hours with winds of less than force 4 at all eight synoptic hours, and also with cloud amounts less than 4 oktas (5 tenths) at all eight synoptic hours are uncommon on the N.E. Atlantic. After some consideration days were classified as follows:-

Day (0-24 G.M.T.)	Description
"Quiet"	Five observations or more with wind force 0-4.
"Windy"	Five observations or more with wind force 6-12.
"Cloudy"	All eight observations in code figures 4-9. (Applied for both former International Code and present International Code).
"Fair"	Four observations or more in code figures 0-5. (Applied for both former International Code and present International Code).

The inclusion of any observation of force 4 on "quiet" days was open to objection, but was found to be unavoidable, as otherwise the number of "quiet" days would have been too small for satisfactory analysis.

A few days which, according to the definitions above, could have been classified as both "cloudy" and "fair", were excluded from the analysis. Afterwards values of the diurnal variation were computed for the classified days. Henceforward the terms "quiet fair" days and "windy cloudy" days will be used with the meaning given above. Values of the ranges of the diurnal variation as defined earlier are given in Table 13.

(f) Reality of the diurnal variation

The results for both stations I and J for the "windy cloudy" days in winter afford strong proof of the existence of a small diurnal variation of air and sea temperature. The low elevation of the sun in winter, together with the rigid classification of the "windy cloudy" days, imply that heating of the ship by insolation would be negligible, and similarly cooling of the ship by nocturnal radiation in these circumstances would be at a minimum.

At both stations the diurnal variation of air temperature is markedly greater on "quiet fair" than on "windy cloudy" days for all seasons, except in winter, when the reverse is true. For sea temperature the diurnal variation similarly is greater on "quiet fair" than on "windy cloudy" days for all seasons, the exceptions being winter and autumn both at station J when the reverse is true.

The code figures for cloud amount had the following significance:-

Code Fig.	Oktas	Tenths
0	0 oktas	0 tenths
1	1 "	trace
2	2 "	1,2 "
3	3 "	2,3 "
4	4 "	4,5,6 "
5	5 "	7,8 "
6	6 "	9 "
7	7 "	9+ "
8	8 "	10 "
9	sky obscured	sky obscured

The results here are in good agreement with those of earlier values as the table below shows:-

Element whose diurnal variation is shown		Magnitude °F.	Location	Authority and date
Air		0.5-0.8		Geiger
Air		0.95 0.85	Station I " J	Gordon 1948-49 " "
Air	All days	0.90 1.03	Station I " J	Hay 1948-51 " "
Air	"Windy cloudy" days	0.63 0.61	Station I " J	" " " "
Air	"Quiet fair" days	1.57 1.93	Station I " J	" " " "
Sea		0.5	Tropics	Geiger
Sea		0.0-3.5	Tropics	Schott
Sea		0.4-0.6	Trades	Sverdrup
Sea		0.4	30°-40°N.	Challenger
Sea		0.22 0.12	Station I " J	Gordon 1948-49 " "
Sea		0.20 0.20	Station I " J	Hay 1948-51 " "
Sea	"Windy cloudy" days	0.05 0.10	Station I " J	" " " "
Sea	"Quiet fair" days	0.33 0.55	Station I " J	" " " "

Further work which has been undertaken to investigate the magnitude of the diurnal variation of the meteorological elements at the ocean weather stations I and J, together with a discussion of the errors to which these measurements are subject, will, it is hoped, be published later in another paper.

6. Summary and conclusions

Monthly means of the meteorological elements observed aboard the British ocean weather ships manning stations I and J have been obtained for the period 1948 to 1952. Features of interest which stand out are the very high frequency of precipitation at all seasons, the low frequency of thunder at all seasons and of fog in the winter half year. The high mean wind speeds at these ocean weather stations, previously indicated by means of ships' data, are corroborated in the data presented here. Mean annual range of air temperature is small at both stations: at station J temperature did not fall below 35°F. during the period discussed, and fell below 32°F. on 18 days at station I. At both stations the monthly mean values of air and sea temperature show that the air is colder than the sea in every month; the difference is largest in the winter, 5.0°F. at station I in January, and smallest in the early summer, 0.2°F. at station J in June.

The magnitude of the diurnal variation of certain elements was also obtained from the data. For all days at both stations the value is about 1.0°F. for air and 0.2°F. for the sea. The existence of a real diurnal variation over the ocean in these latitudes can be inferred from the fact that, for days selected as being windy and cloudy, even in winter there is a diurnal variation of both air and sea temperature. In the case of the air temperature the diurnal variation in winter is greater on "windy cloudy" days than on "quiet fair" days in the same season at both ocean weather stations.

References

1. Gordon, A.H. and Barlow, E.W. Summary of weather and currents at the original ocean weather stations "Item" and "Jig", Marine Observer, Vol.XXII, p.91-97, April, 1952.

2. Carruthers, N. 1943. Quart J.R. Met. Soc., London, Vol.69, p.289.

3. M.O. 483. Monthly Meteorological Charts of the Atlantic Ocean, 1948.

4. M.O. 488. Climatological Atlas of the British Isles, Table I, 1952.

Table 1

Mean Wind Velocity in Knots (1948-52)

Month	Station I		Station J	
	Mean	No. of obs.	Mean	No. of obs.
January	(22.9)	717	22.6	1,251
February	21.5	1,026	21.2	1,117
March	21.4	1,160	20.2	1,244
April	20.0	1,179	17.7	1,219
May	14.9	1,190	14.7	1,255
June	14.1	1,173	14.2	1,207
July	13.6	1,175	13.7	1,209
August	13.4	1,160	16.1	1,204
September	15.8	1,019	16.5	1,189
October	18.0	1,013	20.4	1,207
November	19.6	1,188	20.3	1,203
December	(20.3)	846	22.4	1,175
Year	17.7	12,846	18.3	14,480

( ) = 4 year means only

Note. The height of the anemometer cups above the sea surface in the British ocean weather ships is approximately 55 ft. The figures above refer to the standard height of 33 ft. above the sea surface and were obtained by multiplying the original mean wind speeds by 0.93.

Table 2

Mean Wind Velocities for some Windy Locations

Knots

Month	Adélie Land 1912-13	Macquarie Island 1912-15	Macquarie Island 1948	Heard Island 1948	Hope Bay (Grahamland) 1952	Deception Island (S. Shetlands) 1944-45, 1947-50	Lerwick (Shetland) 9 years data	Valentia (Eire) 35 years data	Station I 1948-52	Station J 1948-52
January	24.4	13.9	-	-	-	11.8	19.3	12.7	(22.9)	22.6
February	28.1	12.7	-	10.5	-	12.4	18.2	12.2	21.5	21.2
March	41.5	13.0	-	19.0	-	12.8	14.3	11.4	21.4	20.2
April	40.8	12.8	16.6	17.4	-	16.2	14.3	10.5	20.0	17.7
May	45.7	14.1	11.3	17.0	23.5	14.4	12.9	9.5	14.9	14.7
June	42.5	14.3	18.4	19.1	16.7	16.5	12.6	8.9	14.1	14.2
July	45.8	14.9	13.1	20.3	18.5	15.0	9.9	8.8	13.6	13.7
August	42.0	14.4	15.4	18.4	19.0	13.8	10.2	8.9	13.4	16.1
September	36.6	15.6	19.0	18.1	18.4	16.4	13.0	9.1	15.8	16.5
October	41.9	18.8	13.5	17.8	21.1	16.0	14.6	10.4	18.0	20.4
November	32.2	13.0	15.8	17.3	17.0	14.2	16.7	11.5	19.6	20.3
December	25.6	14.6	17.4	15.7	17.3	11.4	18.2	12.6	(20.3)	22.4
Year	37.3	14.3	-	-	-	14.2	14.4	10.5	17.7	18.3

Position (to nearest whole deg.)

Macquarie Island 55°S. 159°E.

Heard Island 53°S. 73°E.

Adélie Land 67°S. 137°E.

Hope Bay 63°S. 57°W.

Deception Island 63°S. 61°W.

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Table 3

Percentage Frequencies of Wind Force and Direction

Station I

January

Beaufort Force	N	NE	E	SE	S	SW	W	NW	Calms	Total
Calm									5	0.7
1-3	1.1	0.8	0.8	1.1	1.1	1.6	1.8	2.1		10.4
4	0.7	0.5	0.7	3.4	1.9	3.6	2.2	1.8		14.8
5-6	2.1	0.3	2.7	4.5	6.4	11.1	7.9	4.1		39.1
7	0.5	0.4	0.4	1.0	2.3	4.0	2.5	1.1		12.2
8-12	0.1	0.4	1.6	2.9	4.2	7.7	5.5	0.4		22.8
Total	4.5	2.4	6.2	12.9	15.9	28.0	19.9	9.5	0.7	731 obs.

February

Beaufort Force	N	NE	E	SE	S	SW	W	NW	Calms	Total
Calm									21	2.0
1-3	1.3	1.1	1.1	1.1	0.9	1.7	1.3	2.2		10.7
4	1.0	1.3	1.6	2.4	2.4	2.5	1.9	2.3		15.4
5-6	2.9	2.3	1.4	2.9	8.1	7.5	6.5	5.2		36.8
7	0.8	0.2	0.2	1.3	4.4	6.8	3.3	2.4		19.4
8-12	0.4	0	0.2	1.4	2.2	6.0	4.6	0.9		15.7
Total	6.4	4.9	4.5	9.1	18.0	24.5	17.6	13.0	2.0	1034 obs.

March

Beaufort Force	N	NE	E	SE	S	SW	W	NW	Calms	Total
Calm									16	1.4
1-3	0.8	1.4	0.7	1.1	0.8	1.3	1.0	2.1		9.2
4	1.0	2.7	1.5	3.4	3.8	2.4	1.7	2.7		19.2
5-6	2.4	4.6	3.7	5.8	4.7	6.4	5.4	2.6		35.6
7	0.7	2.0	1.5	1.9	3.3	2.2	3.9	1.1		16.6
8-12	0.9	3.9	3.2	0.8	1.3	3.6	3.6	0.7		18.0
Total	5.8	14.6	10.6	13.0	13.9	15.9	15.6	9.2	1.4	1165 obs.

April

Beaufort Force	N	NE	E	SE	S	SW	W	NW	Calms	Total
Calm									22	1.9
1-3	1.2	1.3	0.1	0.8	1.9	1.7	2.9	2.1		12.0
4	1.1	1.2	0.8	1.3	1.9	2.7	3.1	3.5		15.6
5-6	4.5	2.4	2.8	2.4	5.0	6.9	7.9	10.4		42.3
7	1.2	0.3	1.3	1.4	1.2	2.8	4.2	4.5		16.9
8-12	1.2	0.1	0.3	0.7	0.4	1.9	4.1	2.6		11.3
Total	9.2	5.3	5.3	6.6	10.4	16.0	22.2	23.1	1.9	1186 obs.

May

Beaufort Force	N	NE	E	SE	S	SW	W	NW	Calms	Total
Calm									37	3.1
1-3	2.0	3.2	1.9	2.4	2.2	2.6	2.2	4.5		21.0
4	3.0	4.6	4.6	3.3	2.8	2.8	2.7	2.2		26.0
5-6	2.7	8.6	6.7	5.4	7.7	6.3	3.8	2.0		43.3
7	0.3	0.6	0.6	0.8	1.4	0.1	0.6	0.7		5.1
8-12	0.7	0.3	0.1	0.1	0	0	0.3	0		1.5
Total	8.7	17.3	13.9	12.0	14.1	11.8	9.6	9.4	3.1	1198 obs.

June

Beaufort Force	N	NE	E	SE	S	SW	W	NW	Calms	Total
Calm									26	2.2
1-3	2.3	1.9	1.9	5.2	2.7	2.3	2.1	3.2		21.6
4	3.3	3.6	3.4	8.7	4.0	3.8	4.1	4.2		35.1
5-6	3.0	3.7	6.5	5.9	3.0	5.2	5.0	3.6		35.9
7	0.2	0.8	1.1	0.6	0.3	0.6	0.1	0.4		4.1
8-12	0.1	0.3	0.5	0	0	0	0.2	0		1.1
Total	8.9	10.3	13.4	20.7	10.0	11.9	11.5	11.4	2.2	1180 obs.

Table 3 (contd.)

Station I

July

Beaufort Force	N	NE	E	SE	S	SW	W	NW	Calms	Total
Calm									32	2.7
1-3	2.1	2.3	1.4	1.9	4.7	4.7	5.4	5.4		27.9
4	1.7	0.8	2.1	3.9	5.1	5.7	5.6	4.0		28.9
5-6	1.6	3.0	2.7	2.0	5.1	7.1	7.9	7.0		36.4
7	0	0.1	0	0.2	0.5	0.5	1.1	0.9		3.3
8-12	0.1	0.1	0	0	0.2	0.3	0.1	0		0.8
Total	5.5	6.3	6.2	8.0	15.6	18.3	20.1	17.3	2.7	1185 obs.

August

Beaufort Force	N	NE	E	SE	S	SW	W	NW	Calms	Total
Calm									24	2.1
1-3	3.7	4.5	4.0	3.6	3.7	3.3	3.1	4.5		30.4
4	3.3	3.7	2.4	2.9	3.3	5.0	4.7	3.9		29.2
5-6	5.6	6.2	1.8	3.5	3.1	6.2	3.1	4.0		33.5
7	0.3	1.6	0	0.3	0.2	0.3	0.7	0.1		3.5
8-12	0.2	0.8	0	0	0	0	0.3	0		1.3
Total	13.1	16.8	8.2	10.3	10.3	14.8	11.9	12.5	2.1	1168 obs.

September

Beaufort Force	N	NE	E	SE	S	SW	W	NW	Calms	Total
Calm									44	4.3
1-3	2.5	3.2	2.0	2.4	2.1	3.1	3.2	3.2		21.7
4	2.3	1.8	1.4	3.7	3.7	5.4	4.8	3.9		27.0
5-6	3.1	1.6	2.2	4.0	3.2	5.8	7.2	4.7		31.8
7	0.6	1.1	0.5	0.6	0.4	0.8	2.1	1.4		7.5
8-12	0.8	1.3	0.3	0.5	0.6	1.3	1.9	1.0		7.7
Total	9.3	9.0	6.4	11.2	10.0	16.4	19.2	14.2	4.3	1026 obs.

October

Beaufort Force	N	NE	E	SE	S	SW	W	NW	Calms	Total
Calm									20	2.0
1-3	1.3	1.8	2.0	2.1	1.8	1.9	2.3	2.2		15.4
4	1.0	2.0	1.5	3.6	2.1	3.8	4.2	2.2		20.3
5-6	1.3	2.6	3.6	7.3	7.9	8.9	7.6	3.5		42.7
7	0.4	0.5	0.8	1.7	1.9	1.8	1.8	0.9		9.8
8-12	0.6	0.1	1.6	1.9	1.6	1.1	2.1	0.8		9.8
Total	4.5	7.0	9.5	16.6	15.2	17.5	18.0	9.6	2.0	1024 obs.

November

Beaufort Force	N	NE	E	SE	S	SW	W	NW	Calms	Total
Calm									29	2.4
1-3	1.4	1.6	1.7	2.1	1.2	2.0	2.4	1.9		14.3
4	2.0	3.0	2.4	3.1	1.6	2.4	1.8	3.2		19.5
5-6	2.6	6.7	4.5	5.7	3.5	4.9	6.5	3.1		37.5
7	0.8	2.0	1.6	1.8	0.9	1.2	1.9	1.2		11.4
8-12	0.3	2.3	1.5	1.3	0.9	3.4	4.3	0.9		14.9
Total	7.1	15.6	11.7	14.0	8.1	13.9	16.9	10.3	2.4	1192 obs.

December

Beaufort Force	N	NE	E	SE	S	SW	W	NW	Calms	Total
Calm									11	1.3
1-3	0.7	0.8	0.9	1.5	2.2	1.5	1.1	0.8		9.5
4	1.1	1.1	0.5	2.4	2.8	2.8	3.4	3.3		17.4
5-6	1.5	2.5	2.2	5.8	8.4	8.8	12.7	4.4		46.3
7	0.8	0.6	0.9	0.5	2.7	2.1	2.7	2.1		12.4
8-12	1.9	0	0.7	0.6	1.3	3.2	4.0	1.4		13.1
Total	6.0	5.0	5.2	10.8	17.4	18.3	23.8	12.0	1.3	848 obs.

Table 4

Percentage Frequencies of Wind Force and Direction

Station J

January

Beaufort Force	N	NE	E	SE	S	SW	W	NW	Calms	Total
Calm									17	1.4
1-3	0.5	0.4	0.3	0.6	1.1	1.7	1.4	1.8		7.8
4	0.6	0.4	0.2	0.6	2.1	3.1	1.7	1.7		10.4
5-6	2.0	0.6	0.2	1.5	9.3	11.9	10.6	6.9		43.0
7	0.9	0.2	0	0.6	3.3	5.0	6.1	3.7		19.8
8-12	0.2	0	0	0.6	1.8	3.5	6.7	4.8		17.6
Total	4.2	1.6	0.7	3.9	17.6	25.2	26.5	18.9	1.4	1259 obs.

February

Beaufort Force	N	NE	E	SE	S	SW	W	NW	Calms	Total
Calm									11	1.0
1-3	1.3	0.9	1.1	1.4	1.9	1.6	1.7	1.8		11.7
4	1.5	0.9	1.5	1.9	3.1	3.6	2.9	2.0		17.4
5-6	2.0	2.7	1.9	4.5	6.8	9.9	9.3	4.3		41.4
7	1.0	0.4	1.1	2.0	2.2	3.5	5.5	2.4		18.1
8-12	0.2	0.3	0.2	0.2	0.8	3.0	3.2	2.5		10.4
Total	6.0	5.2	5.8	10.0	14.8	21.6	22.6	13.0	1.0	1130 obs.

March

Beaufort Force	N	NE	E	SE	S	SW	W	NW	Calms	Total
Calm									6	0.5
1-3	0.6	0.7	1.7	1.3	2.4	1.5	1.9	0.7		10.8
4	0.7	1.3	2.4	3.0	2.8	3.1	3.1	1.2		17.6
5-6	2.5	4.5	1.6	5.8	7.0	11.8	8.6	5.5		47.3
7	0.9	1.6	0.9	1.3	2.7	3.9	1.3	1.2		13.8
8-12	1.5	0.8	0.9	1.8	1.4	1.7	1.0	0.9		10.0
Total	6.2	8.9	7.5	13.2	16.3	22.0	15.9	9.5	0.5	1260 obs.

April

Beaufort Force	N	NE	E	SE	S	SW	W	NW	Calms	Total
Calm									17	1.4
1-3	2.2	1.7	1.1	1.5	1.9	2.7	1.8	2.5		15.4
4	3.2	1.9	1.1	2.1	2.8	3.6	3.7	4.9		23.3
5-6	2.8	0.2	0.7	2.5	6.1	9.8	10.6	8.6		41.3
7	0.6	0	0	0.6	1.5	2.6	3.2	3.3		11.8
8-12	0	0	0	0.4	0.5	0.8	3.2	1.9		6.8
Total	8.8	3.8	2.9	7.1	12.8	19.5	22.5	21.2	1.4	1236 obs.

May

Beaufort Force	N	NE	E	SE	S	SW	W	NW	Calms	Total
Calm									31	2.5
1-3	2.5	3.2	2.1	4.0	3.3	2.8	1.6	1.7		21.2
4	3.7	5.1	2.3	4.3	5.6	3.6	3.6	4.4		32.6
5-6	3.2	4.5	1.7	2.8	4.9	2.7	5.1	5.4		30.3
7	1.3	0.7	0.6	0.8	1.1	0.7	0.7	0.9		6.8
8-12	1.8	1.1	0.2	2.1	0.8	0.1	0.2	0.3		6.6
Total	12.5	14.6	6.9	14.0	15.7	9.9	11.2	12.7	2.5	1265 obs.

June

Beaufort Force	N	NE	E	SE	S	SW	W	NW	Calms	Total
Calm									28	2.3
1-3	1.9	1.6	1.6	2.7	3.3	3.7	5.1	4.8		24.7
4	1.7	1.1	1.1	4.2	3.9	7.2	5.6	6.1		30.9
5-6	1.8	0.3	0.9	6.0	4.7	10.1	5.4	6.0		35.2
7	0.2	0.1	0.6	0.7	0.2	2.0	1.1	0.3		5.2
8-12	0.1	0	0	0.1	0	0.7	0.7	0.1		1.7
Total	5.7	3.1	4.2	13.7	12.1	23.7	17.9	17.3	2.3	1224 obs.

Table 4 (contd.)

Station J

July

Beaufort Force	N	NE	E	SE	S	SW	W	NW	Calms	Total
Calm									33	2.7
1-3	2.6	1.5	0.5	2.0	3.2	3.0	4.2	5.2		22.2
4	2.5	0.9	0.4	2.4	5.3	7.0	8.9	6.0		33.4
5-6	1.4	0.6	0.4	1.5	4.2	12.3	12.1	5.7		38.2
7	0.2	0	0	0.2	0.6	0.4	0.7	0.6		2.7
8-12	0.1	0	0	0	0	0	0.2	0.5		0.8
Total	6.8	3.0	1.3	6.1	13.3	22.7	26.1	18.0	2.7	1236 obs.

August

Beaufort Force	N	NE	E	SE	S	SW	W	NW	Calms	Total
Calm									50	4.1
1-3	2.3	1.5	0.6	1.7	2.5	2.7	3.8	4.1		19.2
4	4.0	0.7	0.4	2.3	2.1	3.1	5.6	7.1		25.3
5-6	4.4	0.6	0.5	2.0	3.3	7.6	8.4	10.7		37.5
7	0.3	0.2	0.2	0	0.7	0.9	3.2	1.9		7.4
8-12	0.2	0.2	0.1	0	0.2	1.1	2.5	2.2		6.5
Total	11.2	3.2	1.8	6.0	8.8	15.4	23.5	26.0	4.1	1223 obs.

September

Beaufort Force	N	NE	E	SE	S	SW	W	NW	Calms	Total
Calm									33	2.8
1-3	1.6	2.1	3.1	1.8	2.6	3.5	2.2	1.4		18.3
4	2.1	2.4	2.7	1.7	3.2	4.6	3.9	2.5		23.1
5-6	2.2	1.2	1.7	2.0	5.2	9.4	12.6	7.3		41.6
7	0.3	0	0.1	0.3	1.0	1.8	3.2	2.3		9.0
8-12	0.3	0.1	0	0.1	0.5	1.8	1.4	1.0		5.2
Total	6.5	5.8	7.6	5.9	12.5	21.1	23.3	14.5	2.8	1195 obs.

October

Beaufort Force	N	NE	E	SE	S	SW	W	NW	Calms	Total
Calm									21	1.7
1-3	1.6	1.0	0.7	0.6	0.8	1.6	1.9	2.2		10.4
4	1.5	0.4	1.2	3.2	2.5	3.1	3.8	2.2		17.9
5-6	1.6	2.0	2.3	2.4	7.5	10.3	11.3	5.1		42.5
7	0.4	0.1	0.4	1.2	2.0	3.9	4.3	2.0		14.3
8-12	0	0	0.6	1.0	1.8	2.9	5.3	1.6		12.2
Total	5.1	3.5	5.2	8.4	14.6	21.8	26.6	13.1	1.7	1220 obs.

November

Beaufort Force	N	NE	E	SE	S	SW	W	NW	Calms	Total
Calm									10	0.8
1-3	1.3	1.2	0.6	1.0	1.1	3.1	2.3	1.7		12.3
4	2.5	1.5	1.0	1.5	3.9	2.5	2.6	1.5		17.0
5-6	3.0	3.3	3.1	3.0	4.3	7.8	10.2	7.6		42.3
7	1.5	0.9	0.6	1.8	0.8	2.9	3.4	2.8		14.7
8-12	1.4	0.3	0.7	1.7	1.6	1.7	4.0	1.5		12.9
Total	9.7	7.2	6.0	9.0	11.7	18.0	22.5	15.1	0.8	1242 obs.

December

Beaufort Force	N	NE	E	SE	S	SW	W	NW	Calms	Total
Calm									10	0.8
1-3	0.7	0.5	0.4	0.7	0.8	1.0	0.3	1.2		5.6
4	1.6	0.4	0.3	1.7	2.0	2.2	2.1	3.2		13.5
5-6	2.6	0.5	1.3	3.1	5.5	8.1	13.3	10.1		44.5
7	1.6	0.3	1.0	1.5	1.9	3.5	5.7	5.6		21.1
8-12	0.5	0.1	0.2	1.1	1.4	3.1	5.1	3.0		14.5
Total	7.0	1.8	3.2	8.1	11.6	17.9	26.5	23.1	0.8	1187 obs.

Table 5

Number of Occasions* on which Winds of Beaufort Forces 8 to 12 Occurred Reported for Different Directions During Five Years 1948-1952.

Force	Station I						Station J					
	8	9	10	11	12	8-12	8	9	10	11	12	8-12
Direction (Points)												
1-4	82	20	4	10	0	116	24	5	1	0	0	30
5-8	68	15	5	0	0	88	23	3	1	0	0	27
9-12	75	22	10	1	1	109	51	16	1	0	0	68
13-16	69	27	8	5	0	109	62	18	7	1	2	90
17-20	131	34	19	3	1	188	149	33	10	2	0	194
21-24	241	90	42	13	3	389	202	58	16	3	0	279
25-28	118	18	10	1	0	147	213	67	22	3	2	307
29-32	66	8	5	0	0	79	45	10	4	0	0	59
All (1-32)	850	234	103	33	5	1225	769	210	62	9	4	1054

During 5 years 1948-52 there were
two months when there were no reports for station India.

* Based on 8 observations per day.

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Table 5 (contd.)

Mean No. of Occasions* on which Winds of Forces 8 to 12 Occur each Month
Based on Five Years 1948-52

Force / Month	Station I						Station J					
	8	9	10	11	12	8-12	8	9	10	11	12	8-12
January	(21)	(12)	(7)	(3)	(1)	(44)	30	12	3	0	0	45
February	22	7	3	0+	0	32	15	6	1	1	0	23
March	29	8	2	2	0	41	19	5	1	0	0+	25
April	21	4	1	0	0	26	12	3	0+	0	0	15
May	2	1	0+	0	0	3	4	0+	0	0	0	4
June	2	0	0	0	0	2	2	2	0	0	0	4
July	2	0	0	0	0	2	0+	0	0	0	0	0+
August	2	1	0	0	0	3	5	1	1	0	0	7
September	11	4	0+	0+	0	15	7	1	1	0+	0	9
October	17	2	1	0+	0+	20	8	2	1	0+	0	11
November	24	7	5	0+	0	36	26	5	1	0	0	32
December	(24)	(5)	(3)	(1)	(1)	34	24	6	3	1	1	35
Year	177	51	22	6	2	258	152	43	12	2	1	210

( ) = 4 years observations only.
* Based on 8 observations per day.

Table 6

Pressure at M.S.L., Means and Extremes (1948-52)

Station I

Month	Mean	No. of obs.	Max.	Hour	Date	Year	Min.	Hour	Date	Year	Difference of Values (Table 6 - M.O.483)	Extremes of Pressure over British Isles Highest mb.	Lowest mb.
Jan.	*(1008.0)	878	1036.5	2100	29	1949	954.7	0900	10	1949	+5.5	1055	925
Feb.	1000.6	1054	1041.9	0001	21	1948	945.3	0600	2	1948	-1.4	1050	951
Mar.	1006.1	1210	1033.0	2100	1	1949	971.2	1500/0900	31	1948	-0.9	1045	948
Apr.	1004.8	1204	1035.0	2100	30	1951	970.3	1800	9	1952	-5.4	1045	953
May	1016.6	1171	1036.4	0900	1	1951	981.6	0600	13	1948	+5.3	1042	968
June	1012.1	1164	1032.5	1200	14	1949	981.3	0300	28	1952	+0.5	1034	977
July	1011.7	1159	1032.7	0001	8	1948	980.1	0900	25	1948	+2.7	1038	976
Aug.	1007.1	1152	1027.3	0001	1	1948	980.6	1500	9	1950	-1.9	1032	968
Sept.	* 1007.4	1004	1035.1	1200	14	1952	963.6	0600	4	1951	-0.7	1039	971
Oct.	998.4	1057	1027.8	2100	21	1951	952.3	0001	9	1951	-8.2	1039	947
Nov.	1004.6	1175	1029.5	0001/2100	16/17	1952	963.6	1200	19	1948	+5.6	1044	940
Dec.	(998.7)	1086	1035.6	0001/1200/2100	2/3	1952	948.9	0600	28	1948	-2.3	1050	927
Year	1005.0	13276									-0.1		

* Less than half possible observations in any one month

( ) = One monthly mean obtained by interpolation from a "NACLI" Chart.

Station J

Month	Mean	No. of obs.	Max.	Hour	Date	Year	Min.	Hour	Date	Year	Difference of Values
January	1007.1	1242	1046.4	2100	8	1949	968.4	0001	12	1951	-0.2
February	1008.7	1091	1037.8	1200	18	1952	951.8	0300	4	1951	+3.2
March	1009.2	1236	1037.4	0001	2	1949	957.6	0900	31	1948	-0.4
April	1012.5	1209	1039.5	1200	26	1948	971.7	2100	30	1952	+0.8
May	1014.8	1236	1036.6	1200	25	1952	974.7	0001	1	1952	+1.4
June	1013.7	1200	1035.4	1800	13	1949	981.5	1800	5	1949	-2.4
July	1017.1	1128	1035.5	1200	8	1948	981.3	0300	15	1950	+2.7
August	1010.8	1191	1029.1	1200/1500	16	1949	977.3	0900	8	1950	-2.6
September	1011.0	1171	1032.9	1500	14	1952	972.0	1800	26	1948	-1.4
October	1009.7	1200	1033.9	1200	22	1951	941.0	2100	27	1952	0.0
November	1006.9	1184	1038.4	1200/2100	6	1952	965.6	0001	26	1952	-0.8
December	1008.3	1155	1036.5	0001	20	1948	945.1	1800	26	1951	+1.5
Year	1010.9	14243									+0.1

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Table 7

Air and Sea Temperatures (1948-52)

(Mean Position = 59°29'N. 19°29'W.)

Station I

Month	Temperatures (°F.)																
	Mean Values									Extremes							
	Air Temp.	Dew Point	No. of obs.	Sea Temp.	No. of obs.	Air–Sea Temp. Difference	Mean Daily Max.	Mean Daily Min.	No. of obs.	Extreme Max.	Year & Date	Extreme Min.	Year & Date	Extreme Daily Range	Year	Difference of Values (Table 6 – M.O.483) Air	Sea
January	42.2	36.3	963	47.2	889	-5.0	45.2	40.1	120	51.0	1950 12	28.5	1949 19	13.3	1951	+1.2	-0.3
February	42.5	37.5	1070	47.2	810	-4.7	44.6	40.4	126	52.3	1952 25	31.9	1949 8	14.1	1949	+1.9	+0.5
March	43.3	38.6	1211	47.1	909	-3.8	45.6	41.6	144	51.5	1948 3	29.0	1949 12	11.1	1948	+0.9	+0.5
April	43,3	36.9	1204	47.6	798	-4.3	45.5	41.2	144	52.0	1951 28	31.8	1951 16	12.0	1949	-2.3	0.0
May	47.2	42.2	1170	48.9	794	-1.7	49.1	45.6	144	61.0	1948 18	36.1	1948 2	14.0	1948	-0.3	+0.1
June	50.4	45.9	1163	51.5	779	-1.1	51.6	49.0	141	56.9	1950 28	40.0	1952 2	8.3	1952	+0.1	+0.4
July	52.9	48.8	1159	53.7	827	-0.8	54.4	51.6	142	59.9	1950 31	47.7	1949 15	8.5	1948	-0.8	-0.3
August	53.7	49.1	1152	54.8	810	-1.1	55.2	52.3	140	61.3	1950 2	45.2	1949 15	8.9	1948	+0.4	+0.4
September	52.0	46.8	1004	54.3	740	-2.3	53.8	50.6	128	59.7	1952 9	42.8	1952 30	8.0	1949	0.0	+1.1
October	48.9	44.0	1057	52.0	733	-3.1	50.7	47.1	135	55.1	1951 8	36.2	1951 20	8.2	1952	+0.5	+1.3
November	46.6	41.7	1175	49.7	825	-3.1	48.4	44.9	145	54.7	1952 13	30.2	1950 30	13.4	1949	+0.2	+0.6
December	43.6	38.4	1086	48.5	906	-4.9	45.4	41.0	133	51.9	1948 1,17	28.0	1949 8	11.1	1951	+1.9	+0.3
Year	47.3	42.3	13414	50.3	9820	-3.0	49.0	45.5	1642								

No. of days on station at 60°N. 20°W. = 777
at 59°N. 19°W. = 824

Total = 1601

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Table 8

Air and Sea Temperatures (1948-52)

(Mean Position = 53°06'N. 19°25'W.)

Station J

Month	Temperatures (°F.)																
	Mean Values									Extremes							
	Air Temp.	Dew Point	No. of obs.	Sea Temp.	No. of obs.	Air-Sea Temp. Difference	Mean Daily Max.	Mean Daily Min.	No. of obs.	Extreme Max.	Year & Date	Extreme Min.	Year & Date	Extreme Daily Range	Year	Difference of Values (Table 6 - M.O.483) Air	Sea
January	46.7	41.1	1242	50.3	621	-3.6	49.1	43.8	155	54.5	1952 5	34.9	1950 30	11.5	(1948 (1949	-1.7	-0.7
February	46.3	40.3	1091	50.2	544	-3.9	48.4	43.7	137	54.1	1951 1	35.0	1951 17	16.3	1951	-1.4	-0.5
March	48.5	43.5	1236	50.2	617	-1.7	50.1	46.8	154	54.8	1949 28	38.9	1951 12	10.7	1948	+0.3	-0.2
April	48.1	42.0	1209	49.9	604	-1.8	49.9	46.1	150	54.4	1948 12	38.3	1952 9	10.5	1948	-2.1	-1.1
May	51.2	45.8	1240	52.1	620	-0.9	52.8	49.6	155	58.5	1948 16	39.0	1952 6	8.7	1949	-1.1	-0.6
June	54.4	50.0	1200	54.6	600	-0.2	55.7	53.0	150	60.4	1952 29	45.6	1948 4	7.4	1949	-1.1	-0.9
July	57.5	53.2	1127	57.9	564	-0.4	58.7	55.8	152	64.5	1952 21	51.6	1948 14	8.7	1949	-0.5	-0.3
August	57.5	52.6	1191	59.1	595	-1.6	59.0	56.1	148	65.5	1949 26	50.3	1948 21	7.9	1949	-1.4	+0.6
September	56.4	51.5	1171	57.9	585	-1.5	58.0	54.9	146	65.2	1952 21	48.4	1950 16	7.6	1950	-1.0	+0.2
October	53.7	48.0	1200	55.8	600	-2.1	55.5	52.1	152	61.4	1949 7	43.7	1949 23	9.8	1952	-0.8	+0.2
November	50.5	45.1	1184	53.3	592	-2.8	52.3	48.8	146	57.0 57.0	1948 29 1952 1	40.4	1950 18	8.0	1951	-1.7	-0.3
December	47.8	42.9	1155	51.5	575	-3.7	49.9	45.6	144	56.1	1952 6	35.0	1951 31	12.9	1949	-1.2	-0.5
Year	51.5	46.3	14246	53.4	7117	-1.9	53.3	49.7	1789								

No. of days on station at 53°50'N. 18°40'W. = 789
at 52°30'N. 20°W. = 985

Total = 1774

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Table 9

Weather

Station I

Month	Mean No. of Days Per Month							No. of days
	Precipitation	Rain	Snow Sleet	Hail	T L R/	Fog	Gale*	
January	28	24	14	13	1	0	15	31
February	27	21	11	11	>0	1	11	28
March	26	24	8	8	>0	0	14	31
April	28	26	7	9	0	1	10	30
May	24	23	2	3	>0	3	1	31
June	24	24	>0	0	0	4	1	30
July	27	27	0	0	0	4	1	31
August	27	27	0	0	0	3	1	31
September	25	25	0	1	0	3	6	30
October	29	29	1	3	>0	1	9	31
November	28	28	2	3	0	>0	10	30
December	30	27	9	13	>0	1	13	31
Year	323	305	54	64	2	22	92	365

"Precipitation" includes rain, hail or snow.
Drizzle is included under "rain".

/ Includes T or L in addition to TLR.

* i.e. Force 8 and above.

The symbol >0 denotes a value of 0.1 to 0.4.

Station J

Month	Mean No. of Days Per Month							No. of days
	Precipitation	Rain	Snow Sleet	Hail	T L R/	Fog	Gale*	
January	30	29	2	9	1	>0	18	31
February	25	24	4	8	1	1	13	28
March	27	27	1	3	>0	2	12	31
April	27	26	1	4	0	1	8	30
May	22	22	>0	2	0	3	5	31
June	25	25	0	0	0	7	3	30
July	27	27	0	0	>0	8	2	31
August	28	28	0	>0	>0	3	7	31
September	26	26	0	1	>0	4	7	30
October	29	29	>0	2	1	2	13	31
November	26	26	>0	2	0	2	13	30
December	29	28	1	7	1	>0	16	31
Year	321	317	10	38	5	33	117	365

Number of days per month denotes the number of days (0-24 GMT) on which the particular type of weather was entered in the "present weather" and/or "past weather" on at least one synoptic hour or occasion.

The figures obtained for the original number of days available for the different months have been converted to the equivalent number of days per month which would have been observed if the observations had been made on every day of the month.

Table 10

Percentage Frequency of Occurrence of Visibility (1948-52)

Station I

Vis. / Month	0-50 yd.	50-200 yd.	200-500 yd.	500-1000 yd.	1000 yd.-1 n.mile	1-2 n. miles	2-5 n. miles	5-10 n. miles	10-25 n. miles	>25 n. miles	No. of obs.
January				0.3	0.5	2.3	10.5	24.2	56.7	5.5	705
February				0.2	2.0	4.0	10.2	27.8	43.4	12.4	1063
March					0.4	3.8	17.2	22.2	49.2	7.2	1181
April				0.2	0.8	3.2	10.0	25.8	56.6	3.4	1202
May			0.2	0.6	0.8	3.6	11.8	23.4	48.0	11.6	1170
June		1.0	0.8	1.0	2.8	6.2	12.4	23.0	40.6	12.2	1166
July		0.2	1.4	1.6	2.8	2.8	9.0	22.8	49.2	10.2	1158
August			0.6	1.0	0.4	2.0	7.4	18.0	55.2	15.4	1150
September		0.2	0.2	0.8	1.8	2.0	9.6	20.2	59.2	6.0	1004
October				0.8	1.2	2.6	9.2	21.8	59.0	5.4	1052
November					0.8	2.8	10.8	24.8	46.0	14.8	1174
December				1.3	1.7	2.7	8.5	28.3	55.0	2.5	838
Year	<0.1	0.1	0.3	0.6	1.3	3.3	10.8	23.8	50.1	9.1	12863
No.of obs.	1	16	38	80	166	423	1385	3062	6524	1168	12863

Station J

Vis. / Month	0-50 yd.	50-200 yd.	200-500 yd.	500-1000 yd.	1000 yd.-1 n.mile	1-2 n. miles	2-5 n. miles	5-10 n. miles	10-25 n. miles	>25 n. miles	No. of obs.
January					0.4	2.6	13.0	28.0	44.6	11.4	1233
February			0.2	0.6	0.8	1.6	9.8	32.4	50.2	4.4	1091
March		0.2	0.2	1.2	1.0	3.2	13.0	29.8	49.2	2.2	1238
April		0.2	0.2	0.4	1.0	2.6	11.8	32.4	47.6	3.8	1210
May		0.6	0.6	1.0	0.6	3.2	11.0	26.8	50.0	6.2	1238
June		0.6	2.4	2.4	1.8	3.8	12.0	29.2	40.2	7.6	1190
July		0.2	2.0	1.4	1.8	4.4	9.4	30.0	45.4	5.4	1119
August		1.2	0.8	0.4	2.0	5.8	12.8	26.0	45.4	5.6	1074
September			1.4	1.0	2.4	4.2	9.4	27.0	46.2	8.4	1159
October	0.2	0.2		1.2	1.8	5.2	14.0	32.0	41.4	4.0	1124
November			0.6	0.4	1.0	3.4	9.2	23.0	55.8	6.6	1154
December		0.2		0.6	0.8	4.6	9.4	23.8	48.6	12.0	1098
Year	<0.1	0.3	0.7	0.9	1.2	3.5	11.0	28.2	47.7	6.5	13928
No.of obs.	1	41	103	126	173	487	1534	3930	6642	889	13928

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Table 11

Percentage Frequency of Height of Base Low Cloud (1948-52)

Station I

Month / Height in ft.	0 to 150	150 to 300	300 to 600	600 to 1000	1000 to 2000	2000 to 3000	3000 to 5000	5000 to 6500	6500 to 8000	Above 8000	No. of obs.
January	0	0	0	4	42	39	12	1	>0	2	(686)
February	0	0	2	8	43	33	10	1	>0	3	1042
March	0	0	2	5	37	32	19	2	1	2	1177
April	0	>0	2	8	37	40	11	1	0	1	1194
May	1	1	4	8	26	38	17	2	>0	3	1170
June	1	2	7	6	29	32	15	3	1	4	1160
July	1	1	7	8	30	35	13	2	>0	3	1154
August	1	1	3	7	28	43	12	2	1	2	1145
September	1	>0	4	7	30	40	15	2	0	1	995
October	1	0	5	9	32	40	11	>0	0	2	1046
November	>0	0	2	9	37	39	10	1	0	2	1148
December	1	1	3	5	45	34	9	1	0	1	(829)

( ) = 4 years only

The symbol >0 denotes a value of 0.1 to 0.4.

Station J

Month / Height in ft.	0 to 150	150 to 300	300 to 600	600 to 1000	1000 to 2000	2000 to 3000	3000 to 5000	5000 to 6500	6500 to 8000	Above 8000	No. of obs.
January	0	0	3	8	33	39	12	1	0	4	1193
February	>0	0	2	3	30	41	17	3	>0	3	1091
March	>0	>0	3	7	29	41	15	1	0	3	1241
April	0	1	3	6	25	43	17	1	1	3	1215
May	1	2	4	7	28	34	13	1	1	9	1241
June	3	3	7	11	28	30	15	1	>0	2	1196
July	3	2	9	11	28	27	14	3	0	3	1136
August	1	1	4	9	37	33	11	2	>0	2	1225
September	2	1	6	6	26	40	14	3	>0	2	1165
October	>0	>0	4	8	33	39	12	2	>0	1	1187
November	1	>0	3	7	34	39	12	1	0	4	1186
December	>0	0	2	6	30	50	10	1	0	1	1160

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Table 12

Diurnal variation of pressure, wind and total cloud (all days)

Element	Station	Winter (Dec.-Feb.)	Spring (Mar.-May)	Summer (June-Aug.)	Autumn (Sept.-Nov.)	Year
Pressure (mb.)	I	1.03	.68	.79	.94	.70
	J	.76	.98	.72	.74	.70
Wind (kt.)	I	.92	1.45	.65	.27	.83
	J	.74	.92	.71	1.28	.69
Total cloud (tenths)	I	1.30	.90	.42	1.02	.76
	J	1.35	.95	.72	.96	.88

The ranges given here were obtained by taking the difference between the highest and lowest among the mean values found for all eight synoptic hours for each of the elements.

Table 13

Diurnal variation of air and sea temperature

All days

		Winter (Dec.-Feb.)	Spring (Mar.-May)	Summer (June-Aug.)	Autumn (Sept.-Nov.)	Year
Air temp. °F.	I	.43	1.36	1.31	.68	.90
	J	.56	1.30	1.41	.88	1.03
Sea temp. °F.	I	.12	.24	.32	.10	.20
	J	.05	.36	.35	.08	.20

"Windy cloudy" days

		Winter (Dec.-Feb.)	Spring (Mar.-May)	Summer (June-Aug.)	Autumn (Sept.-Nov.)	Year
Air °F.	I	.91 (57)	1.05 (72)	.71 (29)	.70 (60)	.63 (218)
	J	1.18 (69)	.88 (48)	.91 (37)	.60 (55)	.61 (209)
Sea °F.	I	.09 (54)	.17 (71)	.26 (27)	.13 (60)	.05 (212)
	J	.20 (66)	.19 (48)	.17 (36)	.22 (55)	.10 (205)

		Spring and Summer (Mar.-Aug.)	Autumn and Winter (Sept.-Feb.)
Wind (kt.)	I	3.17 (101)	4.13 (117)
	J	2.64 (85)	3.43 (123)

"Quiet fair" days

		Winter (Dec.-Feb.)	Spring (Mar.-May)	Summer (June-Aug.)	Autumn (Sept.-Nov.)	Year
Air °F.	I	.62 (19)	1.99 (17)	2.09 (38)	1.55 (30)	1.57 (104)
	J	.97 (15)	2.12 (42)	2.43 (35)	1.77 (25)	1.93 (117)
Sea °F.	I	.19 (19)	.26 (17)	.70 (38)	.13 (30)	.33 (104)
	J	.11 (15)	.76 (42)	1.02 (35)	.17 (25)	.55 (117)

		Spring and Summer (Mar.-Aug.)	Autumn and Winter (Sept.-Feb.)
Wind (kt.)	I	2.37 (55)	3.08 (49)
	J	1.63 (77)	4.25 (40)

Figures in brackets denote the number of days used.